The Effect of Simulated Spiritual Sounds on Surat Shabd Yoga and Integrative Therapy on Psycho Physiological States of Consciousness in Health and Disease

Synopsis

Submitted in the partial fulfillment for the requirement of

Doctor of Philosophy

In

Theology

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2024

1. Introduction:

The study of Consciousness is attracting the attention of researchers from all around the globe. Among others, Engineers, Neuroscientists, Psychologists, Medical Doctors and Scientists are exploring the possibility of understanding consciousness from different perspectives. Consciousness is considered to be the inner fabric of the creation. The advent of advanced neuroimaging techniques and computational power has opened up tremendous opportunities to understand the human brain and different states of consciousness. This has led to the creation of trans disciplinary areas of research in consciousness studies that include neurophenomenology, neurotheology, neuro-aesthetics, artificial intelligence and quantum cognition.

It has been realised that achieving the highest state of consciousness is the aim of human life. It is claimed by the saints of the eastern world that Surat Shabda Yoga is the ultra-transcendental meditation technique through which this aim can be achieved. Integrating Spiritual sound simulation, chanting of Holy names, hormonal balance and chakra alignment can help both externally and internally to progress towards higher states of consciousness.

Psycho-physiological-spiritual connections between the mind, body and soul helps understanding of human behaviour and cognition in relation to meditation. Integrative therapy using Spiritual Sound Simulation and Hormonal Therapy have emerged recently as a solution to achieve holistic health. To measure this effect scientifically several modalities like EEG, MEG, MRI, Infrared thermography, Electrophotonics are being tried, separately or in combination. The present study on Surat Shabda Yoga Meditation focuses on measuring the psychophysiological states of consciousness using Electro Photonic Imaging (EPI).

Consciousness:

Consciousness is a broad phenomenon. it can be referred to as an individual's awareness about self and its external environment. Consciousness includes our awareness of the surroundings through senses, intelligence, feelings and emotions, experience in dreams and deep sleep as also intuitive perceptions. These are perceived in the conscious states of wakefulness, dream and deep sleep, trance and other transcendental states (P. Sriramamurti, 2011).The human form is considered to be the most advanced life form that possesses the capability to attain the ultimate reality or Supreme consciousness (Kumar

2006, Easwaran 1997). Meditation is a practice to progress towards higher stages of consciousness in human form.

In the Sant Mat tradition consciousness can be understood as-

"Consciousness is intrinsic to the grand cosmos, both at macroscopic as well as microscopic levels. Man, a creation of planet earth happens to be a perfect microcosm of the macrocosm. Spirit-mind-brain consciousness interactions are at the microcosmic levels analogous to consciousness interactions between Universal spirit i.e. Supreme Being, Universal Mind and Universal Matter, that is physical universe at the macrocosmic levels", (Satsangi, 2010; 2012).

Yoga:

Yoga is an ancient Indian philosophical tradition having a spiritual essence which means "*union with Supreme consciousness"* (Misra, 1960, Satsangi, 2010b).

Patanjali's Yoga Sutras (aphorisms) are 196 threads of wisdom expounding on the theory and practice of yoga. They are considered to be the foundational texts of classical Yoga Philosophy (Iyengar, 1966). योगश्चित्तवृत्तिनिरोधः is a compendious sutra from Samadhi Pada of Patanjali's Yoga Sutras. It refers to the central goal of yoga, which is to remove the fluctuations of the mind, in order to experience the Ultimate Reality and move towards Self-realization.

Nāda yoga is an ancient Indian metaphysical system. It is a philosophical system, and a form of meditation on sound currents that is expounded in various Indian scriptures such as the *Nāda Bindu* Upanishad of Rig Veda. The system's theoretical and practical aspects are based on the presumption that the entire cosmos, including human beings, consists of vibrations, called Nāda. Attaining Samadhi through sound is *Nāda* yoga. Samadhi is the experience of pure consciousness which transcends mind and body. On the journey to experiencing pure consciousness, an individual discovers the wisdom of physical, emotional and cognitive intelligence, the union of body and mind (atman or soul), and the expansion of Atman into *Nāda Braham* or *Shabd Braham* (God of Sound or Word). Beyond the experience of *Nada Brahman* comes the realization of the *Nirgun Brahman* or pure consciousness.

The practice of *Nāda* Yoga has been widely associated with yoga traditions such as *bhakti* or devotional yoga, *kundalini* and *Tantrik* yoga, *Laya* yoga, and *Raja* yoga (Iyengar, 1996).

Yoga-meditation is a well-established experiential science that involves a systematic procedure under

the tutelage of an Adept, to realize a wide spectrum of consciousness, which spans the physical, mental and spiritual states (Vivekananda, 2009).

The primary objective of yoga-meditation is to control the mind and senses, attain a thoughtless state, such that higher states of consciousness are experienced that get more and more refined till one attains supreme consciousness (Satsangi, 2010b).

Meditation:

Meditation is an integral part of yoga and it has been practiced since time immemorial in numerous religious traditions and beliefs, primarily as a means to attain enlightenment and self-realization (Radhakrishnan, 2009).

The different states of consciousness are repeatable, reproducible and verifiable by an Adept. Progressive revelations of higher states of consciousness and the meditation techniques to attain them, have been revealed by sages and saints over the last millennium.

Meditation can be conceptualized as a family of complex emotional and attentional regulatory training regimes developed for various ends, including the cultivation of well-being and emotional balance. Among these various practices, there are mainly two styles, namely, focused or concentrative attention meditation and open monitoring meditation (Lutz et al.,2018b).

Concentrative meditation involves voluntary focusing of attention on a chosen object such as breathing, image, koan, *mantra* or word, a particular nerve centre, such as in transcendental and ultra-transcendental (Surat Shabda yoga) meditation.

Open monitoring meditation involves nonreactive monitoring of the content of experience from moment to moment including mindfulness, shikantaza and other awareness states. There are hybrid practices that use both methods and include vipasanna (Anapanasati -meditation on breathing, is the first step towards it) and Samatha (quieting the mind, in order to achieve states of great focus and calmness) (Venkatesananda, 2010).

The potential regulatory functions of these practices on attention and emotion processes could have a long-term impact on the brain and behaviour. The meditative schools are placed on a continuum between these two categories (Wallace, 1999).

In the recent years there has been an increase in the scientific study on the procedures of Meditation and

its effects on Consciousness. Since 1970s, meditation techniques are used in clinical psychology and physiology for numerous psychological conditions. Psycho-physiology is a branch of neuroscience that tries to understand how a person's mental state and physiological responses interact to affect each other. Modern interest in this area employs methods to determine how some incidents affect human responses. Meditation is described as an attention training practice that observes and regulates the mind and the body (Cahn & Polich, 2006). A number of benefits are observed by various kinds of meditative practices. Mindfulness-based techniques are increasingly used in the treatment of psychological conditions, leading to research in behavioural science (Sedlmeier et al., 2012). Traditionally it was believed that the moral behaviour relies on rationality, principled thinking and willpower of human being, but recent evidences strongly suggest that moral judgement and pro-social behaviour are influenced by emotions and intuition. Training of the emotions can cultivate morality and compassion (Bankard J. 2015). In Buddhism, meditational training is given for improving moral cognition to promote moral action (Sevinc et al., 2018). Meditation has become a popular and effective tool in cognitive behavioural therapy to cure predominant obsession and rational emotive therapy to generate positive emotions (Kumar A. et al.,2016). Awareness and mindfulness in particular may be paramount to unlocking the power of reward-based learning to change addictive habit patterns. (Brewer, 2019). Through meditation, thoughts can be made to appear as mental states that arise and dissipate (Papies et al.,2015).

Surat Shabd Yoga (Ultra- Transcendental) Meditation:

Surat is the soul or consciousness of an individual, while Shabda is the 'Divine sound current', or the 'Essence of Supreme Consciousness'. Etymologically, Surat-Shabda Yoga means the 'Union of the individual consciousness with supreme consciousness' (Misra 1960, Satsangi, 2010a).

In Ancient *Sanskriti* of *Aryavarta*, four sacred words – *Niranjan, Aum, Rarang, Sohang,* and three *Lokas* are mentioned. According to *Sant Mat* fourth *Loka of* The Ultimate Eternal Blissfulness, or *Parmananda* exists where resonates *Satnam and* Ra Dha Sva Aa Mi sound - the "master key" of the highest level of consciousness. Ra Dha Sva Aa Mi sound has been reverberating everywhere since the beginning of the Original Creation (spiritual big bang). The rhythmic sounds of music captivate spiritual sounds or Mystic Words corresponding to various higher regions that govern the energy system of the universe.

Universal Consciousness Realization Postulate:

"The religion of Saints prescribes a systemic methodology of the meditational practice of "*Surat*"*(spirit force)*- "*Shabda*"*(spiritual sound currents)*-"*Yoga*"*(union)* for uniting the spirit force of a human being with the "characteristic" spiritual sound currents, which emanates from the various spirit centres in different regions and sub-regions (i.e., grand divisions and sub divisions) of the macrocosm for realizing corresponding levels of increasing degree of consciousness (or spiritual potential) from the lowest subdivision (nether pole) of the macrocosmic division of physical / material region through the macrocosmic division of the Universal Mind to the highest subdivision of the Supreme Creator or Being (Ra Dha Sva Aa Mi Dham) of purely spiritual region" (Satsangi, 2017).

To perceive these mystic spiritual sounds, there are latent senses, the six ganglia and the corresponding apertures in the areas of the grey matter and white matter of the human brain, which can be activated, only under the guidance of true Adept. The consciousness of spiritual regions of the three grand divisions of creation, according to the Ra Dha Sva Aa Mi faith, namely- 1. Region of Pure Spirituality (Nirmal Chetan Desha), 2. Region of Universal Mind (Brahmand Region-Nirmal Maya Desha) and 3. Material Plane (Pind Region -Malin Maya Desha), can be perceived through subtle energy centres in the human body called *Chakras, Kamals* and *Padams.*

"यथा समष्टि सृष्टि तथा मानव व्यष्टि सृष्टि" (As is in Macrocosm, so is in Human-Microcosm)

Surat Shabda yoga meditation technique of Ra Dha Sva Aa Mi Faith is performed by concentrating at the five chakras -Stomach (Nabhi Chakra), Heart (Hriday Chakra), Throat (Kanth Chakra), Agna Chakra, Sahasrara Chakra, and beyond. This concentration technique of Surat Shabda Yoga Meditation can be augmented by listening to Spiritual musical simulation, (Bell, Conch, Drum, string instruments, flute and lute) and chanting of Holy mystical Names (*Niranjan, Aum, Rarang, Sohang,* Satnam, Ra Dha Sva Aa Mi). This requires rigorous training and practice under the guidance of an adept or "*Guru*".

Surat Shabda Yoga is a type of Spiritual yoga practice in the Sant Mat tradition that can be traced to the teachings of Sant Kabir. It involves two stages:

1) Concentration on the fundamental sound current, i.e., a mantra or chant along with contemplation of a form on a specific nerve centre.
2) Harmonizing with spiritual sound currents, which leads to the attainment of higher states of

consciousness.

Most Revered Sir Anand Sarup Kt. (1957) has explained - *Sahaj Samadhi* is an indescribable state wherein one sees the shining light and gets absorbed in the sound of Anhad Shabda.

The advanced forms of Surat-Shabda Yoga meditation focus on higher sound currents or mantras that help in transcending consciousness beyond that of the universal mind (transcendental states) to the pure spiritual or absolute domain of consciousness (ultra transcendental states) (Satsangi, 2010a, b)

Better Worldliness:

The summum bonum of life is the awakening of Spiritual Consciousness and attainment of eternal bliss. Achieving this goal of human life is possible by practicing Better worldliness which leads to a balanced development of body, mind and spirit. "Better worldliness" is neither unworldliness nor hedonistic, pleasure seeking worldliness but a Golden Mean path leading to higher consciousness.

It is also called the "*Shreya Marg*"- the way to ultimate good, as against "*Preya Marg*"- the way to enjoy temporary pleasures of the world.

Integrative Therapy:

Integrative Therapy incorporates Modern medicine (Allopathy) and Naturopathy, as well as AYUSH (Ayurveda, Yoga, Unani, Sidha and Homeopathy) for prevention and treatment of diseases. As health is affected by multitude of factors inherent to each individual, its environment and economic circumstances, thus working on multiple dimensions to ensure health and wellbeing is the goal of integrative therapy.

Holistic healing is an integrative way to address not only physical and mental ailments in scientific way but also providing Esoteric Healing Touch. It addresses all three causes of human suffering including its root cause *Adibhautic* (physical), *Adidaivik* (mental) and *Adhyatmic* (spiritual). It is based on karmic theory referring to actions and reactions which arise from past thoughts, words, deeds and desire. Surat Shabda Yoga meditation constitutes *Sumiran*, (repeating the Holy name, *Dhyan* (contemplation of Holy form) and *Bhajan* (listening to Spiritual Sounds), leading to higher states of consciousness and the Ultimate Reality.

Integrating Spiritual Sound simulation using various musical instruments along with chanting and Novel Hormonal Therapy for body balancing can act as adjuvants to Surat Shabda yoga meditation, leading to

holistic health. Holistic health is a step towards achieving the ultimate goal of life i.e. self realization and God realization.

Novel Hormonal Therapy:

In human body, achieving homeostasis and maintaining control at the physical and mental plane depends on autonomic nervous system, where sympathoadrenal and parasympathetic systems play a counter regulatory role to each other. The neurotransmitters involved are adrenaline on sympathetic side, responsible for fight and flight mechanism and acetylcholine on parasympathetic side for rest and digest. Adrenaline hormone is normally secreted by the adrenal or supra renal glands, and also in small amount by neurons of human brain. It is a Sympathomimetic agent which regulates vital functions of the body by playing an important role in the fight or flight response.

Most diseases are due to sympathetic and para sympathetic imbalance in human body. As a drug, adrenalin is used in cardiac and respiratory emergencies.

Use of Adrenaline as a novel hormonal therapy in critical medical conditions is propounded for the very first time by Most Revered Professor Prem Saran Satsangi Sahab (e-Herald 9th August 2022).

The effect of Adrenaline hormonal therapy on patients, will be examined in a scientific manner, using Electro Photonic Imaging, as a part of present study.

2. Literature Survey:

It is by establishing contact with the Shabdas of the five Regions (Region of Ra Dha Sva Aa Mi, Sat Loka, Sunn or Dasam Dvar, Trikuti or Region of Brahma, Sahasdal Kamal) that the spirit can ascend upward from one Region to another and thus to the Highest Region. The six Regions of Pind (physical body) are called Chakras. The first Chakra is *Ajna* Chakra, behind the two eyes. The spirit stays here and it spreads in the physical body through the five lower chakras by stages. The second is *Kanth* (throat) Chakra, the third chakra is at the *Hriday* (heart) centre and it is the seat of the Pindi mind from where the body is being regulated. The fourth chakra is *Nabhi* (naval), from here the entire body gets nourishment and it is source of gross *pranas*. The fifth chakra is at the reproductory organ. The sixth chakra is at the rectum, Ashtanga yoga commenced from this chakra. The region of Sahasdal Kamal begins above the eyes (Param Purush Puran Dhani Huzur Soami ji Maharaj, The August Founder of the Ra Dha Sva Aa Mi Faith, 1959).

Recently Pioneering theoretical and experimental scientific studies on Surat-Shabda yoga have been carried out. Theoretical studies include the Systems Modelling of Macrocosm and Microcosm in the Domain of Spiritual Consciousness, Applied Systems Research for Better Worldliness, Spiritual System Theory Framework for the entire spectrum of consciousness, Modeling in Cosmology, Cosmology from the twin vantage points of Ra Dha Sva Aa Mi Faith and Systems Science, Eastern Philosophy in the Spiritual Traditions of Oriental Saints ("Sants"): An Interpretive Structural Model (ISM) Representation, Study of Human Consciousness as a Surrogate of Macrocosmic Consciousness via Scientific Measurements of Electromagnetic Wave Radiations, the Omni-Quantum Theory for Spiritual Consciousness System, Neuro-Environmental Cognitive Spiritual Phenomenology, Hierarchical Order Theory (HOT) of Consciousness, Approach to Integrate Arts (First-Person Spiritual-Cognitive--Material Phenomenology) and Science (Third-Person Neuro-Physical Environmental-Cognitive Correlates) of Consciousness, Integration of East-West Approaches to Consciousness, Spiritual-Psycho-Physical Quantum Theory of Consciousness, with systems based on concrete reality through semi-abstract cognitive systems to highly abstract quantum field theory-based systems (Satsangi et al., 2008a, 2009, 2010, 2007, 2008b, Srivastava et al., 2011, Satsangi et al., 2012a,b, 2013a,b,).

A general rudimentary graph theoretical modeling framework for spiritual domains has been proposed that involves eighteen different levels of consciousness spanning the physical region, region of the universal mind and the pure spiritual region. An omni-quantum theory for spiritual consciousness has been proposed that explains the quantum nature of consciousness (Satsangi, 2010). Further, Graph Theoretic Quantum System Modeling (GSTQM) has been applied for Quantum Information Processing Circuits that include, Logic Circuits : CNOT, Hadamard, etc., Quantum teleportation circuit as a complex "System of Systems" and 3-particle to n-particle quantum teleportation, has also been used to model microtubules in the brain as multi-level quantum Hopfield networks and n-Qubit multiparticle teleportation to n-Qudit contextuality-based quantum teleportation and beyond, to explain different aspects related to consciousness (Srivastava et al., 2011, 2014, 2016, 2017). Experimental studies include, the Measurement of Environmental Correlates of Consciousness during Ultra-Transcendental Meditation at higher apertures in the brain with MEG, Superconducting Quantum Interference Device (SQUID), to measure very weak magnetic fields in a magnetically shielded room. Different states of

consciousness during Surat-Shabda Yoga meditation have been characterized in terms of frequencies recorded with MEG. The famous Weber–Fechner Power Law in Psycho-physics has also been generalized and extended to the spiritual (pure consciousness) domain (Satsangi, 2015). This characterization of the main states of consciousness in terms of frequencies, facilitates the determination of consciousness of any individual with the non-invasive MEG technique. Psychometric Studies on the effect of Surat-Shabda Yoga meditation have been reported using various tests like, Myers-Brigg Type Indicator (MBTI) Test, Daily Religious Inventory (DRI), Consciousness Quotient (CQ), Spiritual Quotient (SQ), Vedic Personality Inventory (VPI), Strength Deployment Inventory (SDI) and a Musical Consciousness Test (Bhasin et al., 2016, Pyari et al., 2015, 2019).

Quantum holographic theory of Physics and Consciousness (QHTC) is introduced as the main framework to conduct research for altered states of consciousness, as it can be used to explain the nature of our reality and non-ordinary states of consciousness. The QHTC says that consciousness is not local and that altered states of consciousness (ASC) can help us understand how our minds work in more than one way. The article also explored specific techniques to gather data for analysis and to induce altered states were discussed- hypnosis, transcendental meditation and binaural sounds and self-affirmations. Technologies used to measure ASC were discussed including biofeedback, neurofeedback and gas discharge visualization (GDV) technology (Raul Valverde et al,2022).

The main principles of Integrative approach are a philosophy and practice of care that addresses the patient's physical, emotional, and spiritual needs. The human body is an open dynamic system, constantly exchanging matter, energy and information with the environment and other people. All these influences can be both positive and negative – we live in symbiosis with the world of bacteria, viruses, and fungi, and are constantly exposed to their attacks. A dynamic, functional approach to all aspects of the body, from anatomy, physiology and the psyche, requires in many ways, a revision of existing medical education programs and the introduction of new elements into them (Korotkov 2023

Meditation is associated with structural changes in the brain and provides evidences that meditational experience is associated with increased cortical thickness. This was the first cross-sectional study to be documented (Lazar et al., 2005). Meditation experience is associated with differences in default mode network activity and connectivity, as per a latest review (Brewer et al., 2011, Fox et al., 2014).

Mindfulness meditation has progressed from being a fringe topic of scientific investigation to being a justified replacement for psychotherapy in certain cases. It has become a tool to generate general well-being which increases cognitive levels and also produces reflection on the brain. A survey on contemplative practice surrounding mindfulness meditation proves its relevance to cognitive psychology (Ainsworth B. et al., 2013). Medical doctors have been able to reduce anxiety, mood symptoms (Hofmann et al.,2010) and post-traumatic stress disorder (King et al.,2016 a, b) in the patients by therapy based on mindfulness.

Metta meditation cultivates an attitude of love and kindness towards everything, including enemies and sources of stress, and builds consequential personal resources. Research on 139 working adults, half of whom were randomly-assigned to begin a practice of loving-kindness meditation, shows that this meditation practice produced increased experiences of positive emotions, over time, which in turn produced increase in a wide range of personal resources (e.g. purpose in life, social support, decreased illness symptoms). In turn, these increments in personal resources predicted increased life satisfaction and reduced depressive symptoms (Fredrickson et al., 2008). Combined with empirically supported treatments, such as cognitive behavioural therapy, love-kindness and compassion meditation may provide potentially useful strategies for treating a variety of different psychological problems that involve interpersonal processes, such as social anxiety, marital conflict, anger, and coping with the strains of long-term care-giving (Hoffman et al., 2011). Multilevel analyses of daily data on the patients with persistent lower back aches show that more loving-kindness practice on a given day is related to lower pain that day and lower anger the next day. Preliminary results suggest, loving-kindness program is beneficial in reducing pain, anger and psychological distress in patients (Carson et al., 2005)

Transcendental meditation (TM) has positive and significant documentable neurochemical, neurophysiological, and cognitive-behavioural effects. Among the main effects are the reduction of anxiety and stress (due to the reduction of cortisol and norepinephrine levels), increase of the feeling of pleasure and well-being (due to the increase of the synthesis and release of dopamine and serotonin), and influence on memory recall and possible consolidation (Mosini et al., 2019). Controlled breathing technique in TM results in controlled respiration rate and reduced blood pressure (Murray, 2018). Deep breathing in TM has long been proved to be an effective tool for curing stress and asthma (Michaels et

al., 1976, Wilson et al.,1975).

An American psychologist, Gardner Murphy, investigated Swami Rama's abilities to control different bodily functions that were thought as completely involuntary, such as his heart beat and blood pressure (Feuerstein, 2014). The results, initiated research on effects of meditation on non-meditators, patients with specific diseases, mental disorders, youth problems in coping with life and many other problems.

A research analysis on brain activity during meditational awareness proved that music helps in generating beyond the mind experience with attainment of higher state of internalized meditation (Teixeira et al., 2018). Tibetan singing bowl meditation may be a feasible low-cost low technology intervention for reducing feelings of tension, anxiety, depression, and increasing spiritual well-being, in individuals who have not previously practiced this form of meditation (Goldsby et al., 2017).

Meditation is beneficial in affective and cognitive processes (Tang et al., 2015). Cognitive effects may differ according to the type of meditation performed (Lutz et al., 2008a, b). Attention training practices include focused attention and open monitoring. A study documented brain activity during different phases of focused-attention meditation and provided a fine-grained temporal analysis of fluctuating cognitive states (Hasenkamp et al., 2012). Focused attention and open monitoring yoga meditation have been shown to enhance attention control, emotion regulation, self-awareness, and improve cognitive control of conflict (Lippelt et al., 2014). The accumulation of evidence based research proves the direct and indirect benefits of Yoga and meditation. It has been found that meditation can modulate the brain mechanism that affects behaviour and anxiety (Krishnakumar et al., 2015).

Sahaja Yoga meditation showed positive results on practitioners meditating daily at home for a few minutes or have attended at least two 45 minutes organized session per week. Research reveals that the meditators are less upset, less angry, less nervous, less tired and are in a state of near well-being as compared to non-practitioners (Hendriks, 2018).

Specific studies have provided evidence that long-term and deep meditation gives better results as compared to short-term meditation. Short-term meditation training has become a successful tool to improve attention, mood, immunity, reduces level of stress hormones, and provides self-regulation. Acute activation differences observed during meditation, relative to rest in long-term practitioners of Sahaja yoga meditation, reflects on the brain structure, as increased regional grey matter differences

(Hernández et al., 2016). During aging process, large scale brain networks exhibit changes in functional connectivity. Recent research suggests, yoga and other contemplative practices may revert in part, some of the aging effects in brain functional connectivity (Santaella et al., 2019).

Growing research in meditation has offered challenges in developing technology and techniques to measure meditation levels. These studies have increasingly involved the use of modern scientific techniques and instruments in the recent years. With the aim to find the best non-invasive and non-intrusive tool to study meditation, many techniques have come into existence.

Electroencephalogram (EEG) is a technique to record the electrical signals of the brain which uses sensors for detecting the changes. These sensors, called electrodes, pick up electrical activity from neurons and send them to a machine which records the brain activity but does not stimulate it. Diagnostic applications focus either on event-related potentials or on the spectral content of EEG. Despite limited spatial resolution, EEG continues to be a valuable tool for research and diagnosis. The first study using EEG, in 1955, captured the brain activity (Feuerstein, 2014). A great deal of research work with EEG lately has focused on detecting the rest and attention state of mind during meditation. It is reliable and can be used for measuring the results of control tasks (Martisius et al., 2016).

An EEG study of Buddhist meditation provides evidences that the subjects develop the ability to consciously evoke clonic seizure-like activity at will, under full control (Dennison, 2019). Investigations on other meditation practitioners studied by EEG proved that meditation decreases mental stress, alcoholic tendencies, drug abuse cases and crime rate in the society (Rao et al., 2005, Tang et al., 2015).

Magnetoencephalography (MEG) was developed in the late 1960s when magnetic fields originating from the brain were first recorded using a single sensor (Cohen, 1968). The process uses sensitive magnetometers for reading electric signals of the brain. Arrays of SQUIDs (superconducting quantum interference devices) are currently the most common magnetometer, while the SERF (spin exchange relaxation-free) magnetometer is being investigated for future machines.

During Sahaja yoga meditation, grey matter and functional connectivity in anterior cingulate cortex are associated with the state of silence when the meditator enters deep meditation. The results have been confirmed by using an echo planar imaging in fMRI. A fMRI study carried out on the three states; focused attention on object of meditation and meditation with focused attention without effort, show

effective results, as the practitioners went into deeper meditation (Telles S. et al., 2014).

Though research on effect of mantra meditation on the brain is sparse, positive results have been yielded by the studies in this field. A study on Gayatri mantra meditation demonstrated that mantra recitation changes the brain activity (Thomas S. et al., 2016).

In Biofeedback technique people are trained to improve their health by learning to control certain internal body processes occurring involuntarily, such as heart rate, blood pressure, muscle tension and skin temperature. Meditation mainly focuses on healing oneself with self- awareness and biofeedback is helpful in this endeavour. The automated self-correct process helps in reducing coronary risk factors such as blood pressure, pulse rate, smoking habits as well as serum cholesterol, triglycerides and free fatty acids in humans by behaviour modification evolved through biofeedback-aided relaxation and meditation (Patel C. et al.,1977). In the western society, due to a highly stressful lifestyle, stress-reducing methods are much needed. The method for providing biofeedback during a meditation exercise includes wearable device with one or more biometric sensors and a user interface. Investigating differential effects of a six-week daily yoga intervention on pain, catastrophizing, and sleep among women with Fibromyalgia showed significant improvements in fatigue, sleep efficiency and pain at the end of the yoga exercises and a preference towards relaxation monitored through biofeedback (Koulouris A. et al., 2019). Mind-body technique meditation in correlation with biofeedback has shown reduced stress and reduced primary headaches in children (Jong et al., 2019).

Infrared thermography is a non-invasive, low-cost detection tool used for analyzing physiological functions related to skin temperature. Technological advances have made thermographic imaging a reliable medical measurement tool. There are potential applications in the field of vascular disorders, endocrinological disorders (eg. diabetes mellitus), regenerative medicine, musculoskeletal disorders, neurological disorders, oncology and surgery. It helps in understanding the traditional systems of medicine - yoga, Ayurveda, acupuncture and meditation (Jasti N. et al., 2019). Thermal imaging investigates the rise in temperatures at various areas of the face/body and the autonomic correlates of implicit emotion regulation in patients (Panasiti M.S. et al., 2018).

Electro Photonic Imaging (EPI) is a non-invasive, non-intrusive, non-radiating technique which helps in the study of energy field and link it to human physiology or psycho energetic centres (Chakra Energy)

and balance of autonomic nervous system and can be used to measure Altered States of Consciousness (Matos, 2021). Experiments are performed to check the validity and repeatability of EPI instrument (Konstantin,2022). The Electrophotographic Measures of the Fingertips of Subjects, Pre and Post-Qigong, have also been studied (Mitya, 2022). Previous studies have shown positive effect of yoga, *yama*, *niyam* and meditation in adults using EPI (Xu W et al.,2021). Health care exercises, Yoga, meditation and Spiritual sound has positive effect not only in adults but in foetus, new born and children as shown in previous studies (Bhatnagar, A. 2011,2019).

The subtle body model (chakra system from yoga), was used as a map of Central Nervous System function in traditional Indian and Tibetan medicine, neuropsychiatry, and neuropsychology. The chakras are psycho energetic centres, which channel and distribute energy through the energetic anatomy via meridian points (Gururaj,2022). The analysis is based on ancient *Nadi* system of Ayurveda (Meridians), also known as Bonghan Ducts or Primo Vessels, in Traditional Chinese Medicine (Kwang-Sup Soh et al., 2013). Each meridian is correlated to an internal organ, which has its own function depending upon other organ systems and physiology. Energy and blood are constantly flowing through meridians which are affected by Emotions, Spiritual Sounds and Meditation. Spiritual Meditation and Physical Environment Influence the Energy Detected by M.E.A.D (Robert T. Peaston et al., 2004).

3. Challenges:

Once considered beyond the reach of science, the neural mechanisms of human consciousness are now being unravelled at a startling pace by researchers. However, the basic challenge in consciousness studies is, how to explain the relationship between physical phenomena, such as brain processes, and experience (phenomenal consciousness, or mental states/events with phenomenal qualities or qualia). This is referred to as the hard problem of consciousness (Chalmers 1995). In other words, why are physical processes ever accompanied by experience? Perception of colour is still an open question, i.e., why a given physical process generates the specific experience it does. In contrast to the hard problem, explanation of how the brain integrates information, categorizes and discriminates environmental stimuli, or focuses attention, are easy problems. Such phenomena can be functionally defined. It is argued that the hard problem may remain unsolved even if neural correlates of consciousness are discovered. Meditation is an age old well-established experiential science that is actively practiced

widely in the East. Although it has been scientifically studied over the past six decades, there are many challenges also, which include, access to advanced meditator's willingness to subject themselves to scientific study, identification of an accurate, non-invasive, non-intrusive and sensitive technique to measure subtle effects, large sample sizes and proper controls. As per the discipline, meditators are not permitted to publicly report inner experiences, except to their Adept, unless specially ordained. Meditation has acquired greater importance in neurophenomenology, in which subjects are required to hold attention on an object or thought long enough to make reliable neuroimaging measurements. There is growing acceptance of the importance of the integration of first-person phenomenology with third-person objective measurements (Price D. et al., 2012, Walach, 2011, 2014). However, effective expressions in reporting inner experiences, especially the transcendental and ultra transcendental experiences that are known to be ineffable, require meditators with considerable expertise to accurately report their experiences.

4. Motivation:

Surat-Shabd Yoga meditation is a very powerful, engaging and less studied technique. Some recently carried out pilot scientific studies have shown excellent results. More detailed studies are required to see its effect on various psycho physiological states that include larger samples, better controls and multiple techniques. DEI provides access to a neighbourhood community that has been advocating and practicing Surat-Shabd Yoga meditation (ultra-transcendental) over the last 200 years. The availability of meditators practicing under an experienced Adept and the availability of adequate resource provided the motivation to undertake this research.

On 2nd July 2022, for the very first time, Revered Huzur Prof. Prem Saran Satsangi Sahab propounded in HIS Discourse, the Spiritually inspired Hormonal therapy using Adrenaline. The present study examines, inter alia, the effect of adrenalin as novel hormonal therapy for its potential use in Surat Shabd Yoga Meditation.

5. Objectives:

The broad objective of the proposed thesis is to study the effect of Spiritual Sound Simulation on Surat Shabda Yoga and the effect of integrative Therapy in health and diseases.

The specific objectives for the proposed research work have been outlined as follows:

1. To study the effect of spiritual sound simulation through musical instruments using EPI.
2. To study the effect of Chanting of Holy Name using EPI.
3. To study the combined effect of spiritual sound simulation through musical instruments and Chanting using EPI.
4. To study the effect of Novel hormonal therapy on Meditation using EPI.
5. To study the effect of Novel hormonal therapy on Critical medical conditions using EPI.
6. To study the effect of Integrative therapy (Spiritual sound simulation, Chanting of Holy Name, Novel hormonal therapy as adjuvants) on Surat Shabda Yoga Meditation using EPI.

6. Methodology:

The effect of Surat-Shabda Yoga meditation on psycho-physiological states has been described in scriptures and teachings of Ra dha sva aa mi Mat and Sant Mat.

The Electro Photonic Imaging (EPI) measurement instrument to be used in the proposed study is called Bio-Well The subtle energy reserve in a person can be measured through EPI technology, based on the concept of quantum biophysics. This method for investigating human functional energy states is based on the stimulation of photon and electron emissions from the surface of the skin whilst transmitting short electrical pulses. Bio-Well device was developed by Dr. Korotkov and his team. It is a reliable, non-invasive tool, verified in many clinical case studies, over the last 20 years. It is a user friendly non-invasive portable device to capture dynamic physiology and energy and alignment of psycho energetic centres. A lot of environmental and internal factors influence the human electromagnetic field. The principle is based on the connection of areas on finger pads with different organs as well as systems of the body according to the science of Chinese energy meridians. EPI data readings (Bio-grams) include energy, stress, and body balance evaluations and also chakra alignment and chakra energy among many other parameters obtained from 10 images of fingers of both the hands and is captured by a CCD camera system. Numbers indicate the level of energy (in Joules). The instrument is very sensitive and has potential use in Consciousness studies.

In healthy subjects, charting of vital parameters like temperature, Pulse, SPO2, BP and weight will be recorded before starting the Meditation 1) with empty mind, 2) with contemplation of Holy form and 3) with the Chanting of Holy Name. Two scans of 10 fingers (baseline and after Meditation with visual and

acoustic simulation) will be captured using GDV camera.

The same process would be repeated on the subjects with Spiritually inspired Instrumental Music (Bell, Conch, Drum, string instruments, flute and lute), before and after sound intervention.

The effect of Adrenaline Hormonal therapy on meditation would be studied in the subjects by recording vital parameters (temperature, Pulse, SPO2, BP and weight) before and after Meditation and then in another session, by giving hormonal therapy.

The study will also include patients with various diseases. Charting of vital parameters (like temperature, Pulse, SPO2, BP, along weight) will be recorded before starting the Adrenaline hormonal therapy along with patient symptoms, medications and diagnosis. Those visiting Saran Ashram Hospital, will be subjected to Electro photonic imaging after taking consent. Two scans of 10 fingers (baseline and after Adrenalin intervention) 10 minutes apart will be captured using GDV camera at the same time of the day (11:00 am to 1:30 pm. EPI will be done in well-ventilated room with no additional EMF, 2 hours empty stomach, empty bladder and bowel, with proper insulation. The GDV camera should be properly grounded and placed at a distance of more than 50 cm from the computer system. Appropriate calibration has to be carried out before capturing the EPI images. After each recording, the camera glass surface has to be cleaned with a soft tissue.

7. Chapter Schema:

CONTENTS:

CHAPTER 1: Introduction

1.1 Introduction

1.2 Consciousness: Microcosm and Macrocosm

1.3 Human Bio Electro Magnetic Field

1.4 Quantum Theory of consciousnee

1.5 Science of Meditation and its effect on Human Body

1.6 Higher States of Consciousness

1.7 Integrative therapy in health and disease

1.8 Better Worldliness

1.9 Scope of study

1.10 Organisation of Thesis

CHAPTER 2: Literature Review

2.1 Introduction

2.2 Basic Tenets of Ra Dha Sva Aa Mi Faith

2.3 Consciousness, Yoga and Meditation

2.4 Electro Photonic Imaging

2.5 Hormonal Therapy

2.6 The Principles and Practice of the Integrative Therapy

CHAPTER 3: Integrative Therapy

3.1 Introduction

3.2 Spiritual Sounds

3.3 Chanting

3.4 Novel Hormonal Therapy

3.5 Meditation

CHAPTER 4: Research Methodology

4.1 Introduction

4.2 Measuring bio energy Field using EPI

4.3 Meridians diagnosis in Human Body in health and disease

4.4 Measurement of symptomatology, Physiology, Psycho energetic centre parameters

4.5 Measuring changes in energy, stress, body balance and Chakra energy, alignment before and after Integrative therapy- Hormonal Therapy, Spiritual Sound simulation, Chanting and Meditation Sample

CHAPTER 5: Observations and Results

5.1 Introduction

5.2 Observations

5.3 Results

CHAPTER 6: Discussion

CHAPTER 7: Conclusion and Future Study

7.1 Introduction

7.2 Research Contribution

7.3 Limitations

7.4 Directions for Future Research

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